

## IN THE CLAIMS

Please amend the claims as follows.

- 1 1. (Currently amended) An apparatus comprising:
  - 2 at least one processor;
  - 3 a memory coupled to the at least one processor;
  - 4 an object oriented program residing in the memory comprising a plurality of
  - 5 instructions; and
  - 6 a dynamic compiler residing in the memory and executed by the at least one
  - 7 processor, the dynamic compiler being invoked during execution of the object oriented
  - 8 program, the dynamic compiler allocating at least one object in the object oriented
  - 9 program to an invocation stack frame for a method that allocates the at least one object,
  - 10 the dynamic compiler comprising:
    - 11 an escape analysis mechanism that marks each instruction that
    - 12 allocates a new object as one of global escape, no escape, and arg escape
    - 13 based on information available from previously-loaded classes that are part
    - 14 of the object oriented program; and
    - 15 an object allocation mechanism that allocates at least one object
    - 16 that is created by an instruction marked as no escape by the escape analysis
    - 17 mechanism to an invocation stack frame for a method that allocates the
    - 18 object;
  - 19 wherein the dynamic compiler analyzes each class as it is loaded to determine
  - 20 whether the newly-loaded class affects the allocation of an object by the object allocation
  - 21 mechanism to the invocation stack frame, and if so, the dynamic compiler changes the
  - 22 allocation of the object to a heap.

1 2. (Cancelled)

1 3. (Cancelled)

1 4. (Currently amended) An apparatus comprising:

2 at least one processor;

3 a memory coupled to the at least one processor;

4 an object oriented program residing in the memory comprising a plurality of  
5 instructions; and

6 a dynamic compiler residing in the memory and executed by the at least one  
7 processor, the dynamic compiler being invoked during execution of the object oriented  
8 program, the dynamic compiler allocating at least one object in the object oriented  
9 program to an invocation stack frame for a method that allocates the at least one object,

10 [The apparatus of claim 1] wherein the dynamic compiler changes the allocation of the  
11 object from the invocation stack frame to a heap due to information that becomes  
12 available from at least one class that is loaded after the dynamic compiler allocates the at  
13 least one object to the invocation stack frame.

1 5. (Original) The apparatus of claim 4 wherein the dynamic compiler changes at least  
2 one pointer to the object allocated on the invocation stack to point to an object allocated  
3 on the heap as a result of information that becomes available as more classes that are part  
4 of the object oriented program are loaded.

1 6. (Currently amended) An apparatus comprising:  
2 at least one processor;  
3 a memory coupled to the at least one processor;  
4 an object oriented program residing in the memory comprising a plurality of  
5 instructions;  
6 a portion of the object oriented program that is selected for dynamic compilation;  
7 a dynamic compiler residing in the memory and executed by the at least one  
8 processor, the dynamic compiler being invoked during execution of the object oriented  
9 program, the dynamic compiler comprising:  
10 an escape analysis mechanism that marks each instruction that allocates a  
11 new object as one of global escape, no escape, and arg escape based on  
12 information available from classes that are part of the object oriented program that  
13 have been previously loaded at run-time; and  
14 an object allocation mechanism that allocates at least one object that is  
15 created by an instruction marked as no escape by the escape analysis mechanism  
16 to an invocation stack frame for a method that allocates the object;  
17 wherein the dynamic compiler changes the allocation of the object from the  
18 invocation stack frame to a heap due to information that becomes available from at least  
19 one class that is loaded after the dynamic compiler allocates the at least one object to the  
20 invocation stack frame.

1 7. (Currently amended) A method for allocating objects to memory in an object oriented  
2 program during dynamic compilation of a portion of the object oriented program while  
3 the object oriented program is executing, the method comprising:  
4 (A) determining whether compilation of the portion is needed;  
5 (B) if compilation of the portion is needed:  
6 (B1) analyzing each instruction in the portion that allocates a new object;  
7 [and]  
8 (B2) allocating at least one object that is created by an instruction to an  
9 invocation stack frame for a method that allocates the at least one object;  
10 wherein acts (B1) and (B2) comprise:  
11 marking each instruction in the portion that allocates a new object as one  
12 of global escape, no escape, and arg escape based on information available from classes  
13 that are part of the object oriented program that have been previously loaded at run-time;  
14 and  
15 allocating at least one object that is created by an instruction marked as no  
16 escape by the escape analysis mechanism to an invocation stack frame for a method that  
17 allocates the at least one object, and  
18 wherein the dynamic compiler analyzes each class as it is loaded to determine  
19 whether the newly-loaded class affects the allocation of an object to the invocation stack  
20 frame, and if so, changing the allocation of the object to a heap.

1 8. (original) The method of claim 7 wherein act (A) comprises determining whether a  
2 method in the portion has been executed a number of times equal to or greater than a  
3 predetermined threshold value.

1 9. (cancelled)

1 10. (Currently amended) A method for allocating objects in an object oriented program  
2 to memory, the method comprising:  
3 loading a plurality of classes that are part of the object oriented program;  
4 executing code from at least one of the plurality of loaded classes;  
5 determining whether dynamic compilation of a portion of the object oriented  
6 program is needed;  
7 if dynamic compilation of the portion is needed, allocating at least one object to  
8 an invocation stack frame for a method that allocates the at least one object;  
9 analyzing compiled code as each subsequent class in the object oriented program  
10 is loaded; and  
11 changing the allocation of the at least one object from the invocation stack frame  
12 to a heap.

1 11. (cancelled).

1 12. (cancelled)

1 13. (Currently amended) A program product comprising:  
2 a dynamic compiler that is invoked during execution of an object oriented  
3 program, the dynamic compiler allocating at least one object in the object oriented  
4 program to an invocation stack frame for a method that allocates the at least one object,  
5 wherein the dynamic compiler comprises:  
6 an escape analysis mechanism that marks each instruction that allocates a  
7 new object as one of global escape, no escape, and arg escape based on information  
8 available from previously-loaded classes that are part of the object oriented program; and  
9 an object allocation mechanism that allocates at least one object that is  
10 created by an instruction marked as no escape by the escape analysis mechanism to an  
11 invocation stack frame for a method that allocates the at least one object;  
12 wherein the dynamic compiler analyzes each class as it is loaded to  
13 determine whether the newly-loaded class affects the allocation of an object by the object  
14 allocation mechanism to the invocation stack frame, and if so, the dynamic compiler  
15 changes the allocation of the object to a heap; and  
16 signal bearing media bearing the dynamic compiler.

1 14. (original) The program product of claim 13 wherein the signal bearing media  
2 comprises recordable media.

1 15. (original) The program product of claim 13 wherein the signal bearing media  
2 comprises transmission media.

1 16. (cancelled)

1 17. (cancelled)

1 18. (Currently amended) A program product comprising:  
2 (A) a dynamic compiler that compiles a portion of an object oriented program, the  
3 dynamic compiler being invoked during the execution of the object oriented program, the  
4 dynamic compiler comprising:  
5 (A1) an escape analysis mechanism that marks each instruction that  
6 allocates a new object as one of global escape, no escape, and arg escape based on  
7 information available from classes that are part of the object oriented program that  
8 have been previously loaded at run-time;  
9 (A2) an object allocation mechanism that allocates at least one object that  
10 is created by an instruction marked as no escape by the escape analysis  
11 mechanism to an invocation stack frame for a method that allocates the object,  
12 wherein the dynamic compiler changes the allocation of the object from  
13 the invocation stack frame to a heap due to information that becomes available from at  
14 least one class that is loaded after the dynamic compiler allocates the at least one object to  
15 the invocation stack frame; and  
16 (B) signal bearing media bearing the dynamic compiler.

1 19. (original) The program product of claim 18 wherein said signal bearing media  
2 comprises recordable media.

1 20. (original) The program product of claim 18 wherein said signal bearing media  
2 comprises transmission media.

- 1 21. (new) A program product comprising:  
2 (A) a dynamic compiler that compiles a portion of an object oriented program, the  
3 dynamic compiler being invoked during the execution of the object oriented program and  
4 allocating at least one object in the object oriented program to an invocation stack frame  
5 for a method that allocates the at least one object, wherein the dynamic compiler changes  
6 the allocation of the object from the invocation stack frame to a heap due to information  
7 that becomes available from at least one class that is loaded after the dynamic compiler  
8 allocates the at least one object to the invocation stack frame; and  
9 (B) signal bearing media bearing the dynamic compiler.
- 1 22. (new) The program product of claim 21 wherein said signal bearing media  
2 comprises recordable media.
- 1 23. (new) The program product of claim 21 wherein said signal bearing media  
2 comprises transmission media.